STATE OF NEW JERSEY
DEPARTMENT OF PUBLIC INSTRUCTION
TRENTON

Arbor Day

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To Superintendents, Principals and Teachers:

The following are the provisions of the statutes of the State concerning the observance of Arbor Day:

> "The day in each year known as Arbor Day shall be suitably observed in the public schools. The Commissioner of Education shall from time to time prepare and issue to schools such circulars of information, advice and instruction with reference to the day as he may deem necessary.
>
> "For the purpose of encouraging the planting of shade and forest trees, the second Friday of April in each year is hereby designated as a day for the general observance of such purpose, and to be known as Arbor Day.
>
> "On said day appropriate exercises shall be introduced in all the schools of the State, and it shall be the duty of the several county and city superintendents to prepare a program of exercises for that day in all the schools under their respective jurisdiction."

You will please notice that Arbor Day now occurs on the second Friday of April, the present Legislature having made the change of date.

It is believed that Arbor Day may well be devoted not only to the consideration of the value of trees and forests, including, of course, the planting of trees and shrubs, but that it may also be used to direct attention to birds and their protection, to the importance of the school garden, and to other related matters. The conservation of some of our natural resources might well be considered as the broad theme of the day, the main emphasis, however, being placed on trees.

Suggestive programs for the use of teachers are included in the pamphlet.

Much of the contents of the pamphlet cannot be considered during the Arbor Day exercises, but will afford suggestive material for

the use of teachers at any appropriate time. The general information given may be of help to many teachers throughout the spring months. The discussions of the various subjects presented may afford valuable reading material in the grammar schools.

The main purpose of the pamphlet is to give an impetus to the movement for a greater interest in our natural resources, and to the movement for a greater appreciation of the opportunities offered by rural or semi-rural life. It is hoped that the suggestions made are such as may appeal to the interests of children.

Acknowledgment is due to State Forester Alfred Gaskill, Dr. K. C. Davis, of the State Agricultural College, New Brunswick, and to Mr. Treadwell Cleveland, Jr., formerly connected with the National Forest Service, who prepared the various discussions.

It is hoped that Arbor Day may be a profitable one to the pupils in the schools. It is further hoped that the influence of the contents of the pamphlet may not be confined to any one day, but may be extended to many days of the school year.

February 1, 1913.

Respectfully,

CALVIN N. KENDALL,

Commissioner of Education.

Trees and Forests.

BY ALFRED GASKILL, STATE FORESTER.

Save What We Have, Let Planting Come After!

Origin of Arbor Day. When the farmers of Nebraska, led by J. Sterling Morton, established Arbor Day, in 1872, they sought the threefold blessing that trees always give—shade from the summer sun, shelter from winter winds, and wood. These men found the broad prairies of the middle west practically treeless and they soon discovered that unless nature's fault was remedied the homes they hoped to make could be neither pleasant, nor secure, nor successful.

Conditions in New Jersey. In New Jersey, as in all parts of the east, conditions were and are different. The whole State was originally unbroken forest, and the task of the pioneers was to make room for fields and settlements. Nearly half our area (46 per cent.) is still forest, though the greater part has been reduced to a woefully poor condition. Thus if *our* festival is to serve *our* needs, we will celebrate Arbor Day in such a way that we shall learn to improve the forests we have rather than seek to make more; to protect and care for the trees we have as well as to plant more; to get rid of false impressions and broaden our understanding of the relations between tree life and human society.

New Jersey's forest area. New Jersey cannot spare more land for forests. She now has upwards of two million acres, and if we apply the rule that a state with 30 per cent. of her area in forests is well off, we shall reduce the total to about a million and a half acres. But this will adjust itself; our present concern is to stop the waste of our forest resources and bring them to serve one of the most highly organized communities in the nation.

Trees alone. With respect to trees, as distinguished from forests, this intensive life and concentrated population make it imperative that cities and towns be provided with parks and as much street shade as possible. Thus there are two ample fields for study and work; the one dealing with trees and their social bearings, the other with forests and their economic relations.

Arboriculture and Silviculture. The art of caring for trees is called arboriculture, and one who devotes himself to it an arborist. The art of producing and developing tree communities or forests is silviculture or forestry.

SHADE TREES.

Why trees are good. One is attracted to a noble oak, a graceful hemlock, a beautifully colored maple, and wants to live with it and its kind. This desire deserves to be satisfied and can be satisfied by encouraging the planting of trees where they will reduce the glare and heat of city streets; on lawns and in parks where they are more at home and can be treated so that the beauty of individuals and the values of groups or masses can be brought out. Especially should they find place upon every school ground so that the attention of the children may be constantly drawn to these hungry, thirsty, breakable, burnable, beautiful friends of man.

What to plant. The kinds of trees that may be planted upon a city street are few, for the life is so hard that only the hardiest can stand it. If we name Norway Maple, Ginkgo, Sycamore, White Elm, Red Oak, the list of the best is exhausted. Others may often be planted where conditions are favorable, and for lawns and parks the list of availables is almost endless, but in any case the wisest course is to avoid novelties and get some one who is experienced to do the planting.

But more important than to plant a tree is it to protect and develop one already in the right place. A newly planted tree has

Care for established trees. a precarious hold on life for several years, whereas an old one has survived many dangers. Let, therefore, the care of the trees that are found to be the first

concern. Guard them from all that may increase their infirmities, keep in check the insects that seek to destroy them, have their wounds attended to and their branches pruned where necessary.

Beware of tree butchers.

This is work for one who knows how, not for the butcher who "tops" a tree "to make it grow"; or for the tree "doctor" who uses cement without knowing whether it will do good or do harm. Reputable men can be found to do any work of this kind. Under wise direction there should be no hesitation about cutting down a tree that is in the way. In many places houses and streets are too much shaded.

Cut down useless trees.

Trees are organisms.

The fundamental idea to be grasped is that every tree is an organism; in one view an individual, in another a community. We must satisfy at least its strongest requirements or it cannot live. To the extent that all are satisfied is the tree healthy and vigorous.

HOW TREES LIVE AND GROW.

The intimate study of trees is full of interest. The sap, consisting of raw food material gathered by the root hairs from the soil, courses upward, through the newer wood cells of trunk and branch, to the leaves; there, under the action of sunlight, it is assimilated with carbon dioxid, and so prepared as tree food passes downward through the newer bark. Thus, the process never entirely suspended, even in winter, but varying in vigor with the seasons, the tree grows in stature by producing new shoots each year. No part of a tree that has concluded a season's growth is ever elongated but remains fixed, and new length is added to its terminal by the development of new buds. This is why a branch always remains at the height at which it started. On account of this fact the age of a tree or branch may be determined by counting back from the terminal one year for each period of development. On most deciduous trees this is hard to follow for more than a few years, but on the evergreens, which produce their branches in

Tree food.

Height growth is terminated each season.

Diameter growth continues.

How to tell the age of a tree.

whorls, it is easy. On the other hand, diameter growth may continue indefinitely and is exhibited on any cross-section in a series of concentric annual rings. A count of these rings will give the age of the tree at that point.

Other interesting things to know are the means by which trees support themselves upright, even in severe storms; how they support the weight of heavy branches, and how the various species differ in the form, color, texture of their bark. Then the flowers and fruits. Few people know that the early spring awakening of the silver maple is marked by the appearance of its flowers weeks before the leaves come out, or that pines and oaks have flowers at all. And so with the fruits; willows produce catkins; chestnuts, burs; elms, samaras; spruce, cones.

Tree flowers.

KNOWING THE TREES.

And then one who is fond of trees will not be satisfied until he can recognize and name at least the commoner kinds. This is field work for many seasons, for the variations as well as the fixed characters must be observed, and there are at least a hundred species to be found in New Jersey. The student will soon want a handbook like "Apgar's Trees of the Northern United States," but without that he will distinguish the two great groups —evergreen and deciduous. The evergreens are also called conifers because the fruit of most of them is a cone. Almost all are ornamental but none is suitable for the street. Their wood is commonly called soft, though that of many species is quite hard, and forms the great bulk of coarse lumber used for building, etc.

Evergreens and deciduous trees.

Deciduous trees are so called because their leaves fall at the beginning of winter. There are many more kinds or species of these than of evergreens and their forms and characters are more varied. A few have recognized values as shade trees; many more are interesting or attractive in the park or on the lawn; others are never found outside the forest. By way of contrast with that of the conifers, the wood of deciduous trees is called hard, though many kinds are

Hardwoods and softwoods.

quite soft, and the trees themselves hardwoods. Hardwood lumber is often very beautiful, and is used for many purposes beside furniture, but the world could better get along without it than without soft woods.

FORESTS.

As with trees so with the tree communities called forests. Our duty in New Jersey is to improve the forests we have rather than to concern ourselves about getting more. Of course waste land may be redeemed by planting with trees, but where there is a remnant of the old forest, nature can be trusted to bring another if she is given a fair chance. The forest secured in this way may not yield so much lumber as one that was planted, and it will not satisfy a forester, but it will answer our most immediate needs, and can be secured more quickly than any other.

Better forests rather than more.

And again, as with trees, let no one fear to have a forest cut off when its time comes. Forest trees were made for use and if they are not used as they mature, nature will get rid of them by decay. That this must be so will appear when one observes that in any piece of native woods room is made for young trees by the fall of old ones that have lived their term.

Forests are for use.

WHY FORESTS ARE GOOD.

Nature clothed most of the habitable earth with forests of one kind or another and evidently meant that they should serve mankind. This they do by furnishing wood for shelter and for warmth (seven-eights of the people of the world still use wood for fuel), by providing grateful shade in summer and protection from cold winds in winter, by preventing the soil on steep hillsides from being lost by erosion, by regulating the flow of streams. The contention that forests cause rainfall, or materially influence the climate of a country, is not established. The weight of evidence indicates that forests thrive in proportion to the rainfall rather

Wood.

Protection.

Rainfall.

than that the rain falls in proportion to the extent of forests.

Stream flow.

And in respect to stream flow we must distinguish between a mountainous or hilly country and a country that is flat, and whether the rain commonly falls in brief, heavy storms or in frequent gentle showers. For instance, we can say with assurance that in North Jersey a forested watershed will discharge a purer, more regular stream than one that is unforested, while in South Jersey the influence of the forest upon the streams is negligible.

THE FORESTS OF NEW JERSEY.

As the climate of New Jersey is essentially the same in all parts, the character of our forests is determined chiefly by soil conditions. Fortunately we have a great diversity, and between the northern and southern sections, strong contrasts. The line

North and South Jersey.

separating these sections is nowhere sharply defined but is commonly assumed to run more or less irregularly from Long Branch to Salem.

The forests of North Jersey, supported by soils of considerable fertility, are almost universally of the mixed hardwood type common to the greater part of the central United States east of the Mississippi river. That is, they are composed of a variety of deciduous trees in which are many oaks, chestnut, beech, several maples, ashes, hickories, elms, birches, etc.

Mixed hardwoods in North Jersey.

This kind of forest in which each species occupies the position to which it is best adapted, and from which therefore all competitors are excluded, is considered by ecologists the most highly developed vegetable society.

A highly organized forest and a highly organized civilization.

And about and among these forests is the most fully developed human society—villages, towns and hiving cities. As exceptions or variants to the type, are swampy areas in which black spruce and hemlock are dominant, and sterile mountain crests bearing the pitch pine and scrub oak of the poorest South Jersey sands.

Practically all these forests have been several times cut over and many times burned. Individual trees about settlements are

often noble and imposing, and occasional groves of fine trees are found, but the forest is only a reminder of what it was—and a promise of what it may be.

Pure pine forest (with exceptions) in South Jersey.

In South Jersey the contrast with North Jersey is emphasized in every way. Instead of hills and valleys the land is level or gently rolling. Near the Delaware and at numerous points in the interior are fertile soils and thriving communities, but much of the territory is characterized by sand and forests of pine, with an undergrowth of scrub oak, often covering hundreds of thousands of acres. This condition justifies the common name of the region "The Pines," though variations in soil frequently give rise to considerable areas of tree oaks, and swamps of white cedar border many of the streams.

On the sandy land profitable agriculture is full of uncertainties; but forestry is not, for there the pitch pine, though burned almost to extinction by the fires that for years swept annually across the level reaches, persists and wherever given a few years' immunity from fire, sends up its arms of living green.

A true forest section.

Here is the great forest area of the State; one of those tracts fitted by nature to maintain trees of a single kind, or single class. These "pure" forests, so called in contrast to the mixed forests of richer regions, are found in the southern states, in the far north and in the Rocky Mountains. They are easily developed, easily logged and always will be, as they now are, the chief source of the world's lumber supply.

FIRE.

The key to the forest problem in New Jersey, as in every state, is the control of fire. It is an undenied fact that more forest is destroyed by fire every year than by the ax.

More forest destroyed by fire than by the ax.

Burning the forest to make plow-land was justifible when trees were an encumbrance, but the practice got us into bad habits. From being a servant fire has become a master. The relation must change. Without fires, we in New Jer-

sey can and will have all the forest we need; with fires, we shall go from bad to worse.

The lesson for Arbor Day, and for every day, therefore, is to urge and require that no forest shall be burned. It is good fun to sit about a camp-fire, yet the danger that the fire will escape and do harm is great. Even a surface-fire that apparently burns only dry leaves, and is often set for that purpose, will kill the young trees that are just starting on the struggle for life. Fortunately New Jersey is getting her fires under control. Firewardens are located wherever there are forests, whose duty it is to prevent fires by every means possible, and if a fire is started they must summon men to put it out. The forests are already responding to this protection and proving their ability to take care of themselves when relieved of the frightful handicap that has been upon them for generations.

The forest must not be burned.

Forest fire-wardens.

PRACTICAL FORESTRY.

Though fire control will make a forest where conditions are favorable as here, the skill of a forester is needed to make it a good and a productive forest. Here is applied a knowledge that is more intimate than that which serves to recognize a tree or to provide for its physical well-being. The successful forester must be a practical scientist in many departments; must have executive ability and be a capable business man. All who cannot meet these requirements should be discouraged from seeking to make forestry their profession.

Foresters.

PARKS.

Every urban community needs parks where those who live in close quarters can find fresh air. And a state with many cities must make it possible for the people to get into the open—not for an hour, but for days and weeks. New Jersey can do this in the woodlands that are so near to most of the large cities. It is not always necessary that the State take title to the land;

few owners object to reasonable use and almost all would gladly remove every restriction if they were assured that the privilege would not be abused.

Forests may be parks also.

The timber forests of continental Europe are universally used as great public parks. Good roads make all parts accessible and the tourists are so accustomed to behave themselves that no harm is done. We can have ample parks of this kind at no more cost than assuring the owners' material interests.

STATE AID.

The State of New Jersey is prepared to help its citizens in any interest connected with the soil. The Forest Park Reservation Commission, Trenton, will advise individuals or communities regarding the care of shade trees and the planting or management of forests. The Agricultural Experiment Station, New Brunswick, will afford similar assistance upon any subject connected with farms, orchards or gardens. Anyone who wants to know how, about any of these subjects, has a right to ask questions and to seek advice.

The Use of the Forests.

TREADWELL CLEVELAND, JR., FORMERLY CONNECTED WITH THE NATIONAL FOREST SERVICE.

It is natural to care for the trees of the forest, on account of their beauty. But it is natural in a sense we seldom think of; because the forest is bound up with the natural history of man.

From the earliest times, the forest has been the intimate part of the life of our race, both its spiritual life and its practical life. Half of the folk-lore of the world comes out of the forest, and at all times the imagination of men has been stirred by the winds talking in the tree-tops, by the play of light and shadow in the forest depths and glades, by the music of the running waters whose sources are the woodland springs. Naiad and dryad, satyr and faun, Diana the Huntress, the great god Pan, Undine, the wicked old witch that lived in the gingerbread house, all are creatures of the sylvan mysteries.

But it is the usefulness of the forest, even more than its appeal to the senses and the fancy, which links it so firmly with the lives of men, with their very fate upon the earth.

As far back as we may care to go in the story of mankind, we find the forest as the trustworthy friend of man, protecting him, housing him, supplying with utensils, with weapons, with food and clothing and fuel; in short, the mainstay of his daily needs. The spear and bow, the dug-out and canoe, the barken thong, the tripod, the flame kindled at the point of the twirled stick, the picture-written birch-bark record, all are eloquent of the intimate rôle which the forest played, and here and there still plays, among peoples living in simple dependence upon Nature's gifts.

Even the most advanced peoples have not, however, succeeded in making themselves independent of the forest. When the English

came to America, one of the things that delighted them most in the new country was to discover the great forests which stretched along the whole coast. Early letters and reports of the colonists dwell with enthusiasm upon the fine store of ship timber which awaited the needs of the royal navy. Masts and spars, as well as tar and pitch, were among the very earliest cargoes sent back to the mother country in the ships that brought the adventurers to Virginia and New England. In the Massachusetts colony the King's surveyor selected for his majesty's ships the choicest trees and marked them with the brand of the broad arrow, to show that they had thus preëmpted.

In New England, where the forests crowded down to the water's edge, whole fleets of staunch ships were quickly built and launched. Indeed, it was the very presence there of ship timber that encouraged the vigorous and successful carrying trade and presently placed Americans ahead of the whole world in maritime daring and in seamanship. The whaling and fishing trades which, as Captain John Smith predicted, laid the foundation of New England's commercial wealth, owed their rapid and profitable rise to the ease with which the merchant vessels could be built of timbers hewn from the forest, and launched upon worldwide enterprises almost within its shadow.

At no time in our history has the forest lost its basic value. Today, as in the first stirrings of the Nation's life, it underlies our undertakings and colors our development. Steadily, year by year, decade by decade, generation by generation, the forest dwindles before the ax, which, from the frontier days to our own, so well symbolizes American history—at once the conquest of a continent and its spoliation.

Very recent indeed, in this country, is the full recognition of our debt to the forest. A quarter of a century ago, a forester was considered a faddist, if indeed a forester was to be found in all the length and breadth of the land. In the beginning of the forestry movement the whole plan and aim of forest conservation was misunderstood. The "Woodman, spare that tree!" attitude of mind prevailed. People thought that what was wanted was to run an

unscalable fence around the forest and guard it religiously from the ravaging hand of man. They could think of no other way of "saving" the forest than to let it stand idle and untouched.

That was before the forester had obtained an intelligent hearing. Now, all is changed. Practically everybody understands in these days that to leave the forest alone is not the way to make it go on serving the needs of men. Its products must be had; the timber is indispensable. The problem which must be solved is how to take timber out of the forest to satisfy our wants, yet leave the supply undepleted, and even increasing and improving.

In the early history of our country the forest was not only a help but a hindrance. Particularly in the Southern colonies, where tobacco and cotton demanded the breaking of ever fresh soil, the forest had to yield to the more paying crops. Later, in the Middle West, immense quantities of the finest hardwood timber went up in flames and smoke at the log-rolling bees; not that the destruction was wanton, but the fertile soil was rightly claimed for the plow.

But after all justification had passed, the old destructive methods were too often continued by the lumbermen, until we have been brought face to face with the plain fact that the end of the forest is in sight.

We citizens of the United States use, for each man, woman and child, vastly more wood than do the citizens of any other country, not because we are compelled to, but simply because we are habitually wasteful.

The foresters know well that, though the exhaustion of the American forests is near at hand, it need never be brought nearer than it now is. They do not ask us to go without wood. On the contrary, their whole appeal to our common sense and good citizenship rests upon the simple truth that we cannot do without it. They merely ask us to treat our forests as Germany, France, Austria, Switzerland, Japan are treating theirs, not as something to be converted into cash as fast as capital and machinery will let us, but as a permanent part of our agricultural system, as a regular crop to be grown on the soil that suits it best.

Some persons whose financial interests, they think, are best served by ignoring the foresters, insist that we are deceived as

to the danger of a timber shortage, because, as they tell us, there is plenty of wood to be had in other countries after ours is all used up. But these persons are themselves deluded if they trust to any such false hope. There already exists a demand for the world supply of timber. The countries that have more wood than they use at home are exporting their surplus to the countries that have not enough. In so doing, the wood-exporting countries are depleting their forests steadily, and facing a day, by no means distant, when their surplus will have been exhausted and they will be forced to retain all that is left of their forest products for home consumption. This country can not rely on any other country in case of a wood shortage here.

Others insist that forests are cumbering land which is needed for food crops, and on this account must go. Rarely, however, is this now true. Most of the land now under forest pays best when kept so. Indeed, in many cases the forest has been cleared for agriculture in vain, for the underlying soil is found to be too poor or too steep-lying to bear cultivation when stripped of the forest which alone could yield a permanent crop from it.

In such countries as Germany, there are places in the very midst of densely populated centers—as in the Rhine Valley—where actual trial has shown that even fertile soils may pay better under a forest crop than under any other. This means, of course, that, as the forest has retreated everywhere, the price of forest products has risen; so that it now pays even to plant a forest and hold it for years, in sure anticipation of a market at good prices when it is old enough to use.

Every indication points to greater, not less, need of timber in the future. In spite of all substitutes, more and more timber is used every year. Meantime, the forests do not grow so thriftily as they should, because they have been so recklessly mishandled.

The forester has the only solution there is. This solution is to protect the forest from its worst enemy, fire, as a first step, and then to take out the timber by tried methods which will steadily increase the vigor and quality of the remaining stock of trees, helping out the result with planting where the cost is not too great. In these ways the forester can make the existing forests produce at least three times as rapidly as they do now, at the same time increasing the proportion of the more serviceable trees.

The problem is real, and the solution is simple and certain. There is no guesswork about either. If we do not call in the forester we shall suffer cruelly from a wood shortage. If we do call him in, this country can grow indefinitely all the wood it will require.

But even if wood should pass out of use completely, the forest would still be exceedingly valuable, because it greatly helps the even flow of streams and rivers used for power and navigation.

If all the power streams in the Nation were now harnessed by the electrical engineers we could give up the use of coal for power, or at least save so much of it that many generations after us would have abundant mineral fuel. And the best thing about these vast power resources, largely unused as yet, is that they renew themselves perpetually—provided the forest stands guard over the headwaters of the streams. The worst and most dangerous thing about them is the likelihood that a few great interests may seize them and hold them, exacting from the public the unjust profits of extortion.

As for navigation, the very best waterways soon become useless if the steep banks of the tributary streams are cleared of forest cover, for in such case the surface soil, left exposed to sun and torrent, is carried off into the river-bed and deposited there in the slack-water, shallowing the channel and causing vessels to run aground.

Thus, the "protection forest," as the foresters say—meaning the forest which conserves the sources of power streams or holds fast the soil on steep slopes—is every bit as useful as the forest which is merely used to cut timber from. And even such protection forests will yield wood, without danger to the streams, if they are carefully handled so that too great a clearing is never made in one place at one time.

As long, then, as men need wood, the forest demands the intelligent skill of the forester; while even if wood should one day become superfluous, the forest will still be priceless as custodian of the waters.

Not to use the forests, if that were thinkable, would be to abuse them by wasteful neglect, to our own sharp loss. To conserve them by the practice of forestry is to use them in the only intelligent, in fact the only permanently possible, way.

Some Common Birds.

DR. K. C. DAVIS, STATE AGRICULTURAL COLLEGE, NEW BRUNSWICK, NEW JERSEY.

The following birds are among those most commonly found about homes and in villages and cities. Check the list and see how many in the list are known at sight or by their calls. What ones are not in your locality?

Robin,
Blue Bird,
Blue Jay,
Junco,
Cat-bird,
Chicadee,
House Wren,
Brown Creeper,
English Sparrow,
Chipping Sparrow,
White-crowned Sparrow,
Song Sparrow,
Baltimore Oriole,
Brown Thrush,
Wood Thrush,
Rose-breasted Grosbeak,
Cardinal Grosbeak (Red bird),
White-breasted Nut-hatch,
Chimney Swift,
Barn Swallow,
Red-headed Woodpecker,
Hairy Woodpecker,
Downy Woodpecker,
Flicker,
White-eyed Vireo,
Red-eyed Vireo,
Philadelphia Vireo,
Warbling Vireo,
Black and White Warbler,
Black Poll Warbler,
Yellow Warbler,
Kingbird,
Least Flycatcher,
Wood Pewee,
Phoebe,
Cedar Wax Wing,
Gold Finch,
Grass Finch,
Cow Blackbird,
Scarlet Tanager,
Red-winged Blackbird,
Ruby-crowned Kinglet,
Ruby-throated Hummingbird,
Cuckoos.

Other very common birds in this State that are usually a little more shy, but are found in suburbs and country are—

Bob White or Quail,
Meadow Lark,
Crow,
Grackle Blackbird,
Killdee,
Sea Birds,
Other water birds,
Bobolink,
Sparrow Hawk,
Marsh Hawk,
Red-shouldered Hawk,
Owls,
Night Hawk,
Buzzards,

Our song birds are decreasing in numbers year by year. There are several causes for this:

1. English sparrows destroy their nests and drive them away.

2. The millinery trade is answerable for the destruction of many birds of beautiful plumage.

3. Cats, squirrels and other animals protected by man are great robbers of birds' nests. Cats catch young birds.

4. Boys kill the birds, and rob their nests. Birds want to live near us, and we can encourage them by letting them alone. Let them be free from fear and danger.

Boys and girls should not collect birds' eggs, because this tends to reduce the number of birds. As good birds are destroyed, bad insects increase rapidly and destroy crops.

Birds and Their Food.

Whether a bird is injurious or beneficial depends almost entirely upon what it eats. Careful studies of the food habits of common birds have already been made by the U. S. Department of Agriculture. These results are given in U. S. Farmers' Bulletins Nos. 54 and 456. Every school should have these bulletins.

Those birds with sharp, slender bills usually feed entirely upon insects, while others with stout, short bills may eat seeds, insects and berries. If they are seed-eaters, they eat both weed seeds and grains.

In some states the common crow is protected by law because it destroys so much waste matter washed up by ocean waves. In other inland states bounties are given for the killing of crows because they destroy young corn in the field.

The bobolink nests in low grounds of the northern states. During the nesting season its food is almost entirely composed of insects, so we consider it a very beneficial bird. But for the winter these birds go in flocks to the South and begin eating grain and are given the name "Rice Birds." There they are killed because of the damage they do to crops.

Those birds which we do not see close by are often blamed for the bad deeds of others which look somewhat like them. This is true with the hawks. In the list given here you will see that we have five useful hawks, while only three hawks are considered very injurious, and only one is common in New Jersey.

Nearly all of our common birds are beneficial to man because they destroy insects and weed seeds.

Below are listed twenty-two species which are beneficial to agriculture and should be rigidly protected. Many people have thought them harmful, but careful investigation of scientists shows that the birds are really helpful to farmers.

Common Name.	*Character of Food.*
Marsh Hawk,	Mice, other small mammals, reptiles and insects.
Red-shouldered Hawk,	Meadow mice, pine mice and other small mammals and insects.
Swainson's Hawk,	Grasshoppers, crickets and small mammals.
Ferruginous rough-leg Hawk,	Principally western ground squirrels (Spermophiles).
Sparrow Hawk,	Meadow mice and grasshoppers.
Barn Owl,	Rats, mice, shrews, gophers and some insects.
Long-eared Owl, / Short-eared Owl,	Mice and a few other small mammals constitute about 90 per cent.
Barred Owl,	Rabbits, mice, squirrels, crayfish and frogs.
Screech Owl,	Mice, beetles, grasshoppers and other insects.
Yellow-billed Cuckoo, / Black-billed Cuckoo,	Injurious insects; caterpillars, especially tent caterpillars; some Colorado potato beetles.
Hairy Woodpecker, / Downy Woodpecker,	Injurious insects; wood-boring larvæ constitute more than 25 per cent.
Flicker,	Injurious insects; ants constitute nearly 50 per cent.
Meadow Lark,	Over 60 per cent. harmful insects, especially grasshoppers.
Baltimore Oriole,	About 80 per cent. injurious insects; especially caterpillars and beetles whose larvæ are known as wireworms.
Rose-breasted Grosbeak,	Potato beetle and other injurious insects.
House Wren,	Beetles, grasshoppers, bugs and caterpillars and spiders form its entire food.
Robin,	Beetles, grasshoppers, caterpillars and wild fruit.
Chickadee,	Minute insects (bark lice) and insect eggs.
Bluebird,	About 25 per cent. grasshoppers, with many caterpillars and spiders.

Four birds injurious to agriculture and unworthy of protection.

Common Name.	*Character of Food.*
Sharp-shinned Hawk, / Cooper's Hawk, rare,	Poutry, game birds and many small insectivorous birds.
Duck Hawk, rare,	Game and water birds.
English Sparrow, common,	Grain (especially wheat and oats), fruit buds and blossoms.

Bird Houses.

We can build houses for some kinds of birds. Bright boys can suggest many forms of houses for the birds. They need not be elaborate.

It is best to put them near the top of a smooth post which pussy cannot easily climb. Secluded places are best.

For the wee birds, such as the chicadee and wren, the openings in the houses may be too small for the English sparrow to enter; the size of a silver half-dollar will do. For the larger birds the hole should be the size of a two-inch auger.

Make only one opening for each house or each room of the house. Houses with only one room are usually best except for the martins; they prefer to build in colonies. The purple martins are seldom found in New Jersey.

A perch to use as a doorstep should always be placed just below each doorway. Do not paint the houses this spring as some birds do not like the odor of paint.

A simple bird house may be made of a tomato can, turned on its side, with the cut lid turned down as a doorstep. A chalk box with a roof on it, to keep out rain, and a hole in one end for a door makes a good house for small birds. Larger boxes of tin or wood may be used. Some of these may be covered with coarse bark, tacked on to give a rustic effect.

The School Garden.

Schools should take an interest in vegetable gardening. When planning the work for Arbor Day decide on a place for a school garden if possible. If their is no room on the school ground perhaps some vacant spot near the school may be secured for the purpose. It should not encroach too much upon the playgrounds of the children.

LAYING OFF THE GARDEN.

There are two plans of laying off the schcol garden. (1) Assigning a small rectangular plot, 4 x 7 feet or larger, to each pupil. (2) Have the garden long and narrow and let the rows

run the long way of the garden, then let each pupil have a row, a half, or smaller fraction as his own; the rows may be three or three and a half feet apart. This second plan allows the use of a horse cultivator or wheel hand-hoe in the garden, which may be desirable particularly in the vacation season. The first plan requires all the work to be done by hand.

Have each pupil of a certain age or grade plant the same things so there will be a chance for comparison and competition.

Among the plants giving quick results in early spring may be mentioned radishes, lettuce, spinach, onions, early beets. If the garden can be properly cared for during the summer vacation by the students who volunteer or by the janitor, then longer season crops may be started in the spring; but it is well to use the quick-growing ones also.

VACATION GARDENS.

Whether there be a good school garden or not, it is always possible to plan some good vacation gardens for the pupils to care for. These should be planted either at home or, for city children, vacant lots may be used. Let the planting be done at the proper times in the spring while school is in session and have reports made from time to time.

Prizes may be offered for the best results with each kind of vegetable or for annual flowers, and other prizes for best displays and collections shown at the school at a certain time in the fall.

The teacher, or a committee of patrons appointed by the teacher, may secure the prizes. It is best to let these premiums consist of suitable articles donated by individuals, as merchants and others. Money for cash prizes is often harder to raise.

There are several aims of the home and vacant-lot gardens in villages and cities:

To train children in the cultivation of the soil, and give knowledge of gardening for pleasure and profit.

To make waste places, whether in backyards or in vacant lots of the city, useful and beautiful. The appearance of such cities

as Minneapolis, Cleveland, Dayton and Detroit has been revolutionized by such work, and vacant lots improved in value.

Teachers and prize committees should enlist the services of the local press in making the movement popular. Even the rural schools will find it advantageous to publish the premium lists and news about the contests in the nearest local papers. The names of the pupils who enter the contests should be published.

Seeds and bulbs are obtained by the communities at wholesale prices and furnished to the pupils at cost or entirely free. The bulletins relating to gardening, mentioned in the U. S. Farmers' bulletin lists, should be obtained free and given to each pupil in the contest.

Corn Contests.

In the country one of the best contests to carry on through the vacation is corn growing, in connection with the growing of vegetables and flowers.

This spring, corn may be brought from homes without shelling and the lots tested by the ear method as described in U. S. Farmers' Bulletin No. 253. Save the corn that germinates well for use in the contest.

A few exercises in the selection of good corn may be conducted at the school. Suitable forms for this work may be had by sending a stamp to the Principal of the Short Courses, College Farm, New Brunswick, N. J. State the number of pupils to be supplied for this exercise. U. S. Farmers' Bulletin No. 229 will also help.

Let each pupil who joins the corn club (enters the contest) secure the use of one-fourth acre of ground at home, for this purpose. Many boys who have entered such corn-growing contests in other places have raised more corn per acre than their fathers ever raised.

Each boy entering a corn contest in the counties of Burlington, Monmouth, Camden, Gloucester and Morris should also get from their teachers or county superintendents the address of the county Y. M. C. A. secretary and join the county contest there. In Ocean County a county contest is on. Write to the county superintendent of schools at Toms River.

The special premiums for corn growing may be awarded in the fall or early winter when the exhibit is held at the school. These premiums could be for:

Best ten ears of yellow dent corn.

Best ten ears of white dent corn.

Ten ears yellow dent grown by boy under nineteen years, producing greatest yield in bushels on measured plot of one-fourth acre.

Ten ears white dent grown by boy under nineteen years, producing greatest yield in bushels on measured plot of one-fourth acre.

Second prizes may be offered for each of these.

(See U. S. Farmers' Bulletin No. 385, on Boys' and Girls' Agricultural Clubs.)

United States Farmers' Bulletins.

There is a list of bulletins of the above title on many valuable subjects. They will help teachers in preparing for Arbor Day and will be useful in the schools as supplementary reading. Each teacher shoulud write to her congressman at Washington, asking for the number of copies of each bulletin which she is likely to need in the exercises and contests suggested in this circular. Find your congressman's name in this list, and in writing refer to the Farmers' Bulletins by number:

United States Senators—James E. Martine; Frank O. Briggs.

Congressmen—First district, William J. Browning; Second district, John J. Gardner; Third district, Thomas J. Scully; Fourth district, Ira W. Wood; Fifth district, William E. Tuttle, Jr.; Sixth district, William Hughes; Seventh district, Edward W. Townsend; Eighth district, Walter I. McCoy; Ninth district, Eugene F. Kinkead; Tenth district, James A. Hammill.

FARMERS' BULLETINS.

35. Potato Culture.
44. Commercial Fertilizers
54. Some Common Birds.
113. The Apple and How to Grow It.
134. Tree Planting on Rural School Grounds.
154. The Home Fruit Garden; Preparation and Care.

155. How Insects Affect Health in Rural Districts.
157. The Propagation of Plants.
173. Primer of Forestry. Part I: The Forest.
181. Pruning.
185. Beautifying the Home Grounds.
195. Annual Flowering Plants.
196. Usefulness of American Toad.
218. The School Garden.
229. The Production of Good Seed Corn.
248. The Lawn.
250. The Prevention of Stinking Smut of Wheat and Loose Smut of Oats.
253. The Germination of Seed Corn.
255. The Home Vegetable Garden.
270. Modern Conveniences for the Farm Home.
287. Poultry Management.
324. Sweet Potatoes.
339. Alfalfa.
348. Bacteria in Milk.
354. Onion Culture.
357. Methods of Poultry Management at the Maine Agricultural Experiment Station.
358. A Primer of Forestry. Part II: Practical Forestry.
359. Canning Vegetables in the Home.
382. The Adulteration of Forage-plant Seeds.
383. How to Destroy English Sparrows.
385. Boys' and Girls' Agricultural Clubs.
389. Bread and Bread-making.
400. A More Profitable Corn-planting Method.
407. The Potato as a Truck Crop.
408. School Exercises in Plant Production.
409. School Lessons on Corn.
414. Corn Cultivation.
415. Seed Corn.
423. Forest Nurseries for Schools.
428. Testing Farm Seeds in the Home and in the Rural School.
434. The Home Production of Onion Seed and Sets.
440. Spraying Peaches for the Control of Brown-rot, Scab and Curculio.
444. Remedies and Preventatives Against Mosquitoes.
447. Bees.
450. Some Facts About Malaria.
456. Our Grosbeaks and Their Value to Agriculture.
459. House Flies.
460. Frames as a Factor in Truck Growing.
464. The Eradication of Quack-grass.
468. Forestry in Nature Study.
472. Systems of Farming in Central New Jersey.
478. How to Prevent Typhoid Fever.

Suggestions to Teachers.

DR. K. C. DAVIS.

As the season of planting is upon us and all nature is preparing to show her most gorgeous dress, we should interest the pupils in ways of beautifying the school. There is not a school in the land that cannot be made better, and many of them may be improved very much. The pupils will take a great interest in the matter if they receive a little encouragement and leadership on the part of their teachers.

Beautify the school grounds. A woven wire trellis supporting a thrifty vine would be a splendid screen for unsightly outbuildings. Shrubs about the foundations of the school building, in the angles of walks and growing in natural clumps in the corners of the grounds would add beauty to the school surroundings. A few plots not used for play nor for garden may be grassed. Never scatter the trees or shrubs openly about the lawn area. Better mass the shrubs in natural clumps in angles or foundations, walks and borders. Use the trees along boundary and division lines. Native trees and shrubs are always preferable to imported or exotic kinds.

PLANNING FOR ARBOR DAY.

This should begin early and should include a number of lines of preparatory work.

Send for the bulletins first.

Draw plans of the grounds, measuring the lines and distances to make it somewhat accurate. If a class is assigned to this task the best map may be framed for the future use of the school. A passepartout binding, at least, may be used. This map may show the plan of planting for several years, if there is more to

be planted than can be done this year. The walks, buildings, clumps of shrubs, trees, school garden, playgrounds, etc., should all be shown.

This work may be done by arithmetic or geography classes. The arithmetic class may also find suitable dimensions for the corn-contest plots.

Have the reading classes read about birds, gardening, trees, lawns, weeds, etc. Use the newer words in spelling exercises. Let boys and girls both make bird-houses at home, as suggested in this pamphlet. These may be ready to put up on Arbor Day.

The corn testing and seed study should begin at once.

Trees, shrubs and seeds that are to be planted on Arbor Day, or soon after, should be ready in advance. The roots of trees and shrubs must be temporarily covered with soil to prevent drying out.

Some exercises in root grafting of apples may be carried out as described in two of the bulletins, 113 and 408.

Tools to be used in the planting of school grounds may be brought by pupils from their homes; the list available for the purpose should be made in advance.

Divide the students into suitable groups for the work. so that each will know his part.

Invite parents and home folks to the work of Arbor Day, and make it a community exercise. The men may come in the morning to work and the women come with lunch baskets at noon; and stay until the exercises are over.

Plan to have some one take pictures of the children and patrons while the improvement work is going on.

Do not forget to have some manure and good soil hauled in advance.

SUGGESTIVE PROGRAMS.

1. Remarks by the teacher or a member of the school board on the value of teaching the useful and beautiful as well as the classical and historical.

2. Have five pupils stand together. The first pupil will read from this pamphlet or tell in his own way why we should all know more about trees; the second about insects; the third about weeds; the fourth about birds; and the fifth about corn.

3. Have five girls stand and each tell a few things about some useful bird mentioned in this pamphlet.

4. Have a boy who has made a bird box tell how bird boxes are a protection to young birds, and how he made his.

5. Have a boy tell of some ways of destroying English sparrows learned from U. S. Farmers' Bulletin No. 383.

6. Another boy should tell how to distinguish English sparrows from other sparrows and common birds.

7. Have some of the best tree planters tell how to plant a tree—preparation of soil, roots, pruning and actual planting.

Note.—In any or all of these exercises pupils may get the subject matter from this pamphlet and from bulletins referred to in it. They may make note on paper of what they wish to say and speak from these notes. If the time for preparation be very short the points may be copied and read directly. Let each exercise be very short.

Another Program suggested for the last part of Arbor Day:

1. Announcement of outlines of contests in school or home gardening, corn growing, or other work the school may be planning, and the premiums offered for the contests and exhibits next fall.

2. Debate (two pupils on each side) "Are crows more harmful than beneficial to man?" (In place of crows may be substituted blackbirds, or hawks, or English sparrows.)

3. Some pupils may tell of several benefits of trees and forests, or five pupils may stand together and each tell of one important benefit.

4. Have a pupil describe how to test seed corn by the individual ear method.

5. Have two pupils tell of the two types of insect moths, each telling how to control such insects.

6. Have a boy tell of three or four things necessary to improve the home lawn. (See U. S. Bulletin No. 248.)

7. Have three pupils stand and each take one part.

a. Use of vines to beautify the grounds at school or home, and name some vines to use in certain places.

b. Use of trees in same way.

c. Use of shrubs in same way.